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ABSTRACT

The primary focuse of the research project reported in this paper over a five-year period has been on investigating the effectiveness of vocabulary teaching strategies, with particular emphasis on the two semantic-based instructional strategies of semantic mapping and semantic feature analysis. A series of five varied studies evaluated these strategies for vocabulary acquisition. All verified that these strategies are not only powerful tools for vocabulary development but good alternatives to the traditional instructional activities presented before students read a new passage (pre-reading). In this latter application, semantic mapping and feature analysis serve not only to introduce key vocabulary from a passage but also to activate students' prior knowledge of a topic, thereby better preparing students to understand, assimilate, and evaluate the information in the material to be read. In addition, when used after reading a new passage (postreading), semantic based instructional strategies provide a review of the material that anchors new knowledge to prior knowledge. In a secondary focus of the research project to determine the role of vocabulary instruction in actual classroom practice, a field survey of teachers was conducted. Results indicate that vocabulary instruction and emphasis are not high priorities with most classroom teachers. (NKA)

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FINAL REPORT

Project on the Investigation of the Effectiveness of Vocabulary Instruction

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The work reported in this paper summarizes five years of research by the Project on the Investigation of the Effectiveness of Vocabulary Instruction. The primary focus of project research has been on investigating the effectiveness of vocabulary teaching strategies, with particular emphasis on the two semantic-based instructional strategies of semantic mapping and semantic feature analysis. Semantic mapping and semantic feature analysis are methodologies which build upon the prior knowledge bases of children. Both strategies are based on the formation of categorical relationships and capitalize on the hierarchical nature of memory structure. A secondary focus of the project research was to determine the role of vocabulary instruction in actual classroom practice. A field assessment of the emphasis that elementary school teachers place on teaching vocabulary was conducted in 1984.

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The Role of Vocabulary Instruction

Knowledge of word meanings has consistently been identified as one of the most critical skills related to success in reading. Numerous research studies have verified the significant role that vocabulary knowledge plays in reading comprehension. While there is general agreement among teachers, researchers and teacher educators alike that word knowledge is an important component of reading comprehension, there is not a consensus about why word knowledge is so important.

At least three positions attempt to explain the high correlation between vocabulary knowledge and linguistic competency. The first, the instrumentalist hypothesis, claims that word knowledge enables text comprehension. How vocabulary is learned is not of prime concern; however, once possessed, word knowledge helps the reader to understand text. The second position, the aptitude hypothesis, suggests that some students are more able to comprehend text because of superior verbal ability; that is, children with the greatest verbal ability tend to comprehend the best. The third position, the knowledge hypothesis, examines the relationship of stored word knowledge to the comprehension of written discourse. Word knowledge is viewed within the context of what a person knows and brings to the task of comprehending text. The basic premise of this position is that prior knowledge is crucial to understanding text. Not only are the individual word meanings important, but the entire conceptual framework elicited by word meanings interacts with text to produce comprehension for the reader.

The educational implication of the first two hypotheses is that instructional strategies that are designed to increase vocabularies or that emphasize drill on reading fundamentals (e.g., word identification, practice of literal recall) will increase text comprehension. The educational implication of the knowledge hypothesis, however, is that text comprehension will be improved by instruction that taps the prior knowledge base by consciously pointing out the categorical relationships inherent in word knowledge.

The acquisition of new word knowledge is based, in part, on the fact that "comprehension is building bridges between the new and the known"; that is, for new concepts to be learned, they must be related to concepts already known. Based on recent information-processing theories, the importance of prior knowledge and the way it is stored and retrieved has prompted a new focus in vocabulary research on determining appropriate vocabulary teaching techniques. This past decade, in fact, has seen a resurgence of interest in vocabulary instruction. Researchers have begun to explore the effectiveness of particular vocabulary teaching strategies for general vocabulary development and for preteaching for textbook selections. Recently studies have been conducted which consider prior knowledge as a concomitant variable and use teaching strategies that tap prior knowledge in their research.

Over the last five years the research of this project at the Wisconsin Center for Education Research has focused on identifying and evaluating vocabulary teaching strategies. The research has centered on evaluating two instructional strategies which not only provide viable alternatives to many of the traditional vocabulary

activities but also reinforce the general knowledge hypothesis. These two strategies, semantic mapping and semantic feature analysis, draw their strength from the activation of students' prior knowledge bases.

Instruction Based on the General Knowledge Hypothesis

Semantic Mapping

Semantic mapping is a categorical structuring of information in graphic form. It is an individualized content approach in that students are required to relate new words to their own experiences and prior knowledge (Johnson & Pearson, 1984). A completed semantic map provides the teacher with information about what the students know and reveals anchor points upon which new concepts can be introduced. A completed semantic map from a vocabulary development lesson is shown in Figure 1.

Figure 1. Classroom map for Stores. (Note: Words with an asterisk are vocabulary words introduced by the teacher.)

Student discussion is crucial to the success of semantic mapping. Through this process, students learn the meanings and uses of new words and new meanings for known words. In addition, they see old words in a new light, and they see the relationships among words.

Semantic Feature Analysis

Semantic feature analysis is an instructional strategy which capitalizes on the categorical nature of memory structures for individual words and words in prose contexts. This strategy focuses on the ways in which words within a category are alike and different and, through discussion, relates their meanings to prior knowledge. In semantic feature analysis, vocabulary is presented in a logical, classified way. Grids display the relationships between words as well as the finer nuances within and between concepts. An illustration of a semantic feature analysis grid used in a pre-reading lesson is shown in Figure 2. Further information about semantic feature analysis is presented in Teaching Reading Vocabulary by Johnson and Pearson (1984).

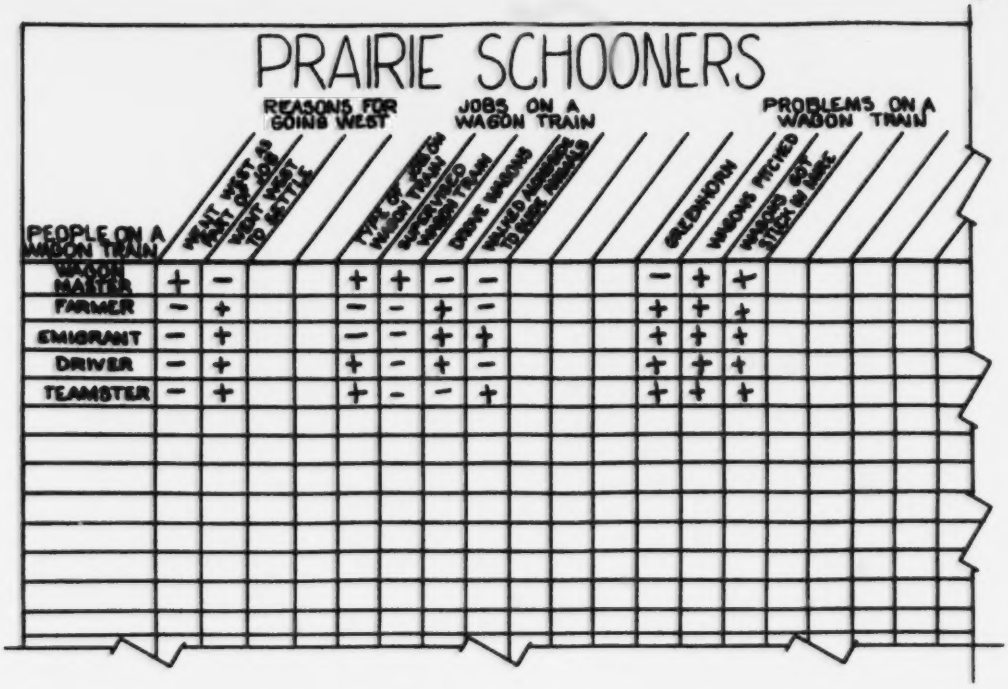
PRAIRIE SCHOONERS
REASONS FOR GOING WEST
JOBS ON A WAGON TRAIN
PROBLEMS ON A WAGON TRAIN
PEOPLE ON A WAGON TRAIN
WANT WEST AS PART OF JOB
WENT WEST TO SETTLE
TYPE OF WAGON TRAIN
SUPPORTED WAGON TRAIN
DROVE WAGONS
WALKED ALONGSIDE TO HERD ANIMALS
GRUEDHORN
WAGONS PITCHED
WAGONS GOT STUCK IN MUDDY
WAGON MASTER + − + + − − − + +
FARMER − + − − + − + + +
EMIGRANT − + − − + + + + +
DRIVER − + + − + − + + +
TEAMSTER − + + − − + + + +

Figure 2. Semantic feature analysis grid developed in a pre-reading lesson.

Research on Semantic Based Strategies

In 1981 and 1982 a series of studies was conducted to evaluate semantic mapping and semantic feature analysis as instructional strategies for general vocabulary acquisition. The first major study compared the two semantic based strategies of semantic mapping and semantic feature analysis with the more traditional instructional approach of contextual analysis. This study was conducted with over 1,000 children from 36 fourth-, fifth-, and sixth-grade classrooms. Students were taught three vocabulary lessons per week for each of three weeks. Results of the study showed that subjects who were taught target vocabulary words through semantic mapping and semantic feature analysis significantly outperformed students who learned the words through contextual analysis. Analysis of scores on the

retention test administered approximately four months after instruction also indicated that the two prior knowledge strategies were more effective than the traditional instructional approach of contextual analysis (Johnson, Toms-Bronowski, & Pittelman, 1982).

A study parallel to the first study was conducted in the Republic of China. In this study, the conventional Chinese method was used in place of the traditional contextual analysis method employed in the original study. This Chinese method is essentially a memory drill approach which focuses on the meanings, pronunciation, and writing of the Chinese characters. While analysis of the data indicated that the conventional Chinese method was the most effective for teaching vocabulary, the study did validate the effectiveness of the two prior knowledge strategies: the improvement in performance between the vocabulary pretest and the comprehensive vocabulary posttest was highly significant for all three strategies (Johnson, Pittelman, Toms-Bronowski, Chu-Chang, Tsui, Yin, Chien, & Chin, 1982).

An additional study on semantic mapping was conducted in 1982 with rural Native American, inner city black, and suburban sixth-grade students to examine the resources and processes used by children of different cultural groups as they participate in vocabulary instruction (Karbon, 1984). Subjects received semantic mapping vocabulary instruction and then were individually interviewed to determine relationships between prior knowledge and vocabulary acquisition. Karbon concluded that students do exploit their unique experiences as a means of developing vocabulary. She recommended that teachers use vocabulary techniques that build on prior

knowledge, emphasizing that semantic mapping provides an alternative technique to vocabulary instruction that focuses on the relationships between new and known words.

In 1983 the research focus expanded to include an evaluation of the effectiveness of the two prior knowledge-based strategies as methods of pre-reading instruction to enhance passage comprehension. A study was conducted to compare semantic mapping and semantic feature analysis with a modified basal approach for effectiveness as pre-reading instructional treatments for both vocabulary acquisition and passage comprehension. Thirteen fourth-grade classrooms participated in the study. Results indicated that all three pre-reading treatments were effective in teaching the target vocabulary words. Significant gains were observed between the vocabulary pre- and posttests for the students receiving full instruction and for the students in the partial control condition that received vocabulary instruction but did not read the passage. The study also confirmed the strong relationship between prior knowledge and reading comprehension. Students with a high level of prior knowledge performed well on the passage comprehension test regardless of treatment. While there were no significant treatment differences between subjects on the passage comprehension test, when subjects were grouped by prior knowledge level there was a tendency for the comprehension scores for students in both the semantic mapping and semantic feature analysis groups to be higher than the scores for students who received the more traditional basal pre-reading instruction (Johnson, Pittelman, Toms-Bronowski, & Levin, 1984).

Jones (1984) replicated a portion of the Johnson et al. (1984) study to further evaluate semantic mapping as a strategy for vocabulary acquisition and passage-specific reading comprehension. In the Jones study, semantic mapping was compared with a specific basal approach with 67 fifth-grade black inner-city students. Jones reported that the semantic mapping group scored significantly higher on the vocabulary and passage-specific comprehension posttests than did the subjects in the conventional basal treatment group. She concluded that semantic mapping does positively affect vocabulary acquisition and passage-specific comprehension of expository passages.

The final study in this research series focused on the use of semantic mapping with students of low reading ability. The primary question addressed in this study was whether poor readers learn more from semantic mapping vocabulary instruction when instructed with other poor readers in a small group (as is typically the case for reading instruction), or whether poor readers learn more through semantic mapping when instructed as part of a whole class of students with mixed reading abilities. Subjects for the study were from eleven fourth-grade classrooms from eight schools in a large midwest suburban school district. The students in the low reading group from six of these classes participated in the full instructional treatment, while students from the five other classes served as an outside control. Results of the study showed that group size did not matter. Poor readers who received semantic mapping instruction had significantly higher gain scores than did students in control classes. Furthermore, the study confirmed that teachers can feel

comfortable using semantic mapping both in reading ability groups and in whole class content area instruction (Pittelman, Levin, & Johnson, 1985).

To help promote the practical application of our research findings on semantic mapping, the paper Classroom Applications of the Semantic Mapping Procedure in Reading and Writing was prepared (Hagen-Heimlich & Pittelman, 1984). This paper presented nine classroom applications of the semantic mapping procedure in a variety of content areas. The paper also discussed the theoretical rationale for the effectiveness of the semantic mapping procedure and presented a review of research studies on semantic mapping.

Findings and Applications

The five years of research conducted at the Center has verified that semantic mapping and semantic feature analysis not only are powerful strategies for general vocabulary development but are good alternatives to the traditional instructional activities presented before students read a new passage (pre-reading). In this latter application, semantic mapping and semantic feature analysis serve not only to introduce key vocabulary words from a passage but they also activate students' prior knowledge of a topic, thereby better preparing students to understand, assimilate and evaluate the information in the material to be read. In addition, when used after students read a new passage (post-reading), semantic based instructional strategies provide a review of the material that anchors new knowledge to students' prior knowledge.

M. Buckley Hanf (1971) has elaborated on the concept of the use of semantic mapping as a pre-reading as well as a post-reading activity. In the Hanf application, semantic mapping is used as a study skill to guide the processing of textbook material. Hanf suggested that semantic mapping provides an advanced organizer to enable the reader to better comprehend the material to be read as well as an effective substitute for the traditional notetaking and outlining procedure.

Vocabulary Instruction in the Elementary School

While the importance of word knowledge for reading comprehension is widely acknowledged, there appears to be little systematic planning in school programs for instructing for increased word knowledge. O'Rourke, in his study Toward a Science of Vocabulary Development (1974), asserted that vocabulary instruction has typically been viewed in a normal context and taught in an unstructured, incidental, or even accidental manner. He concluded that there is no systematic general approach to vocabulary instruction in schools and that no attempt has been made to look at vocabulary development as an integral part of the language system.

To determine the role of vocabulary instruction in actual classroom practice, a field assessment of the emphasis that elementary school teachers place on teaching vocabulary was conducted by the Wisconsin Center for Education Research (Johnson, Levin, & Pittelman, 1984). In Winter 1984, a survey was distributed to 359 elementary school teachers of grades one through five from seven

school districts around the country. Questions were directed at vocabulary instruction within the reading program as well as within the total curriculum.

It is apparent from the results of the survey that vocabulary instruction is alive--but perhaps not completely well--among the elementary school teachers represented by the survey sample. Direct vocabulary instruction before reading a basal passage received a high priority from the teachers surveyed. There is, however, a great deal of listing words on the chalkboard and then using either word attack skills or context to deal with them. Little emphasis was given to meaning-based instructional activities, particularly those that relate new vocabulary to prior knowledge and experience. Furthermore, completion of workbook pages continues to be a major instructional activity at the expense of discussion and classification. In other words, the responses from the survey indicate that, while we are teaching words, we may not be teaching them in the most effective ways.

It also seems that too little vocabulary instruction is done outside of the basal reading program, considering the research showing the strong relation between vocabulary knowledge and comprehension. Johnson and Pearson in Teaching Reading Vocabulary (1984) recommended that up to 20 minutes per day outside the reading period be devoted to direct vocabulary instruction; however, the results of the survey indicated that 52 percent of the teachers did not allocate any time to vocabulary instruction as a separate subject.

It was encouraging to note that, contrary to some research findings, low ability students in the survey sample are receiving at

least as much as (or more) vocabulary instruction than their more capable classmates. Time spent with low ability students on vocabulary instruction is of increased importance when considered in light of Gambrell, Wilson, and Gantt's (1981) finding that "good readers" are provided "easy" reading materials in which they encounter only one unknown word out of one hundred, while "poor readers" are given "difficult" reading materials where they encounter one unknown word out of every ten consecutive words. If Gambrell et al.'s research findings reflect a common educational practice, then it is extremely important that teachers of below grade level reading ability groups give a high priority to teaching vocabulary prior to their students' reading of a passage.

It is hoped that the resurgence of interest in effective vocabulary instruction will encourage teachers to inject more vitamins into their vocabulary programs.

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